UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,900	02/26/2002	Hisaaki Gyoten	10059-410US(P23466-01)	5187

570 7590 06/04/2003

AKIN GUMP STRAUSS HAUER & FELD L.L.P.
ONE COMMERCE SQUARE
2005 MARKET STREET, SUITE 2200
PHILADELPHIA, PA 19103-7013

EXAMINER
ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
1745	6

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/069,900	GYOTEN ET AL.	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 February 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3 and 5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 02/26/02 and 06/18/02 was considered by the examiner.

Drawings

3. The drawings filed on 02/26/02 have been accepted.

Specification

4. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. *It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited.* The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

5. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

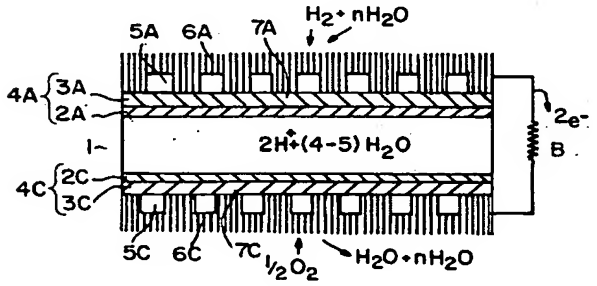
8. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tozawa et al 5607785 in view of Saito et al US 2002/0034672.

The instant application is directed to a polymer electrolyte fuel cell wherein the disclosed inventive concept comprises the specific electroconductive resin layer on the separator substrate. Other limitations include the specific surface area of carbon powder; the vitreous carbon and the specific layer.

With respect to claim 1:

Tozawa et al disclose a polymer electrolyte electrochemical cell (title) wherein the electrochemical cell employs a solid polymer electrolyte membrane (ion exchange membrane) (COL 1, lines 7-10). *Figure 1* below shows a constitution of a polymer electrolyte fuel cell in which an anode side gas diffusion electrode 4A consisting of an anode side porous catalyst layer 2A and an anode side current collector layer 3A bonded with each other is bonded to one surface of the ion exchange membrane 1, and an cathode side porous catalyst layer 2C and a cathode side current collector 3C bonded with each other is bonded to the other surface of the ion exchange membrane 1 (COL 1, lines 21-44). A separator 6A having reaction gas supply grooves 5A is in contact with the anode side gas diffusion electrode 4A and current collecting portions 7A are constituted between the adjacent supply grooves 5A of the separator 6A. Similarly, a separator 6C having reaction gas supply grooves 5C is in contact with the cathode side gas diffusion electrode 4C and current collecting portions 7C are constituted between the adjacent supply grooves 5C of the separator 6C (COL 1, lines 21-44). It is disclosed that by connecting both current collector portions 7A and 7C with a load 8, and supplying hydrogen to the anode and oxygen to the cathode, electric power can be taken out through the load 8. *Thus, the separator material is required to be a conductive material.*

FIG. 1 PRIOR ART

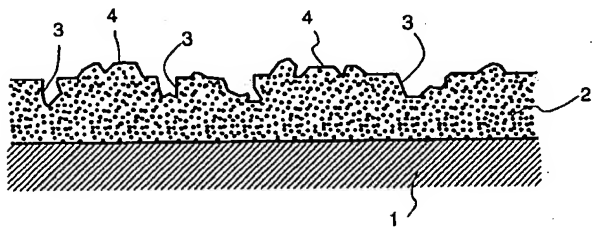


Tozawa et al disclose a solid polymer electrolyte fuel cell according to the foregoing. However, Tozawa et al do not expressly disclose: a) the separator comprising a metal substrate and the specific electroconductive resin layer comprising the specific resin and electroconductive particulate substance and b) the particulate substance comprising vitreous carbon.

With respect to claim 1:

Saito et al disclose a fuel cell separator (title/section 0003) which can be used in solid polymer type fuel cell (0007) wherein the separator has a film on the surface (ABSTRACT). It is disclosed that the separator comprises a conductive coating of particular composition on a base material to form on the base material a film made of the conductive coating (SECTION 0020). Figure 1 shows the separator 1 having a film 2.

Fig.1



The conductive coating comprises a conductive powder and a binder (SECTION 0021). The conductive powder includes, for example, a powder of a carbon material typified by natural graphite, acetylene black, carbon black, etc. (SECTION 0021) wherein the conductive powder have a specific particle diameter (SECTION 0022). The binder used in the conductive coating may be any binder including, for example, thermosetting resin, thermoplastic resin, rubber or the like (SECTION 0023). The thermosetting resin includes, for example, *polyamideimide* and

fluororesin, among others (SECTION 0025). *It is noted that polyamideimide resin is a resin having basic radicals.*

It is also disclosed that as the base material for fuel cell separator a metal material e.g. titanium, aluminum, stainless steel can be shaped into a separator.

As to claim 3:

It is disclosed that the conductive coating comprises a conductive powder wherein the conductive powder includes, a powder of a carbon material typified by natural graphite, artificial graphite, carbon black, ketjen black, expanded graphite or the like (SECTION 0021). It is also disclosed that there is no particular restriction as to the kind of the conductive powder as long as the powder is conductive (SECTION 0021). It is further disclosed that as the base material for fuel cell separator a carbon separator material made of glassy carbon can be used (SECTION 0035). *It is noted that glassy carbon is also called vitreous carbon.* It is also disclosed that a coated separator material can be obtained by coating the separator material with a noble metal or carbon material and a separator material obtained by combining two or more kinds of the above separator materials (SECTION 0035).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the separator of Tozawa et al by comprising the specific metal substrate and the specific electroconductive resin layer comprising the specific resin and electroconductive particulate substance of Saito et al because Saito et al teaches that separators for solid polymer type fuel cell are desired to have electrical conductivity and low electrical resistance and the use of Saito et al's specific metal separator and conductive coating of particular composition on the separator improves the electrical conductive and low electrical

resistance behavior of the separator. Furthermore, since the separator has a role of transferring the electricity generated as the gas diffusion electrode of the fuel cell to the exterior, those of ordinary skill in the art would be motivated to employ the specific metal separator and conductive film material of Saito et al to obtain a fuel cell separator having enhanced conductivity.

As to the particulate substance comprising vitreous carbon, it would have been obvious to one skilled in the art at the time the invention was made to make the separator of Tozawa et al by comprising the particulate substance comprising vitreous carbon of Saito et al because Saito et al disclose that the conductive coating comprises conductive powder including a powder of a carbon material without particular restriction as to the kind of the conductive powder as long as the powder is conductive. Accordingly, since Saito et al employs glassy carbon to make a conducting separator material, those of ordinary skill in the art would be motivated to use an electroconductive particulate substance such as glassy carbon to make the required conducting coating or film on the separator material. Moreover, Saito et al do encompass to use glassy carbon as the electroconductive particulate substance because his disclosure teaches that any kind of conductive powder as long as the powder is conductive can be used in the film as well as the possibility to obtain a coated separator material by coating the separator material with a carbon material with the proviso that the separator as a whole can be obtained by combining two or more kinds of the disclosed separator materials including glassy carbon.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tozawa et al 5607785 in view of Saito et al US 2002/0034672 as applied to claim 1 above, and further in view of Nakamura et al 6451469.

Tozawa et al and Saito et al are applied, argued and incorporated herein for the reasons above. In addition, Tozawa et al and Saito et al do not expressly disclose the carbon powder having the specific surface area.

Nakamura et al disclose a fuel cell separator unit having a rubber layer coated on the periphery of the surface of a separator to form a thin rubber layer (ABSTRACT/COL 4, lines 39-41) wherein the rubber layer may contain a reinforcing carbon black such as acetylene carbon black, Ketjen carbon black, carbon black, among others; wherein the carbon black has a specific surface area of about 5-150 m^2/g, preferably about 10-100 m^2/g (COL 6, lines 9-16).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make to use the carbon powder having the specific surface area of Nakamura et al in the separator layer of Tozawa et al and Saito et al as Nakamura et al disclose that a separator rubber layer may contain carbon black to as reinforcing element. Thus, the mechanical properties of the separator layer are enhanced. *Further, Nakamura et al's disclosure is consistent with the teachings of Saito et al to use carbon powder as a separator layer constituent.*

10. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tozawa et al 5607785 in view of Saito et al US 2002/0034672 as applied to claim 1 above, and further in view of the Japanese publication JP 11-126620.

Tozawa et al and Saito et al are applied, argued and incorporated herein for the reasons above.

Note: for purpose of prosecution, the transitional claim language "having" in claim 4 has been interpreted as open-end language.

As to claim 4:

In addition, *Saito et al* disclose a coated separator base material obtained by coating the base separator material with a noble metal or a carbon material (SECTION 0035). *Accordingly, the separator material of Saito et al would include the separator base material wherein the base material is first coated with a noble metal or a carbon material and further having the conductive coating comprising the conductive powder and the resin thereon.*

However, neither Tozawa et al nor Saito et al expressly disclose the specific layer material.

The JP'620 publication teaches a separator for a fuel cell constituting a solid polymer type fuel cell comprising a material made by applying a coating layer composed of Sn or WC on a surface the separator material (ABSTRACT).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the separator layer of Tozawa et al and Saito et al by having the specific layer material of the JP'620 publication as the JP'620 publication teaches that by applying a coating layer composed of the disclosed specific layer material the separator surface

exhibits excellent corrosion resistance characteristics. In addition, the coating layer is high in electroconductivity and thus, current collecting performance is prevented from lowering.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. This prior art is pertinent because it was cited in an International Search Report. However, the examiner did not find them fully relevant for the following reasons: a) the JP 11-345618 document discloses coating metal separator material for solid polymer fuel cell wherein the passive film is formed on the surface of the plate used as a base material wherein the conductive coating film comprises graphite powder and carbon black on a resin, however, the JP'618 document appears to be silent to the first and second electroconductive separator plates having the specific gas channels for supplying a fuel or oxidant gas to the diffusion electrodes.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745